

SEQUENCE LISTING

<110> University of Rochester
Fay, Philip J.
Wakabayashi, Hironao

<120> RECOMBINANT FACTOR VIII HAVING INCREASED SPECIFIC
ACTIVITY

<130> 176/61701

<140>

<141>

<150> 60/526,664

<151> 2003-12-03

<160> 7

<170> PatentIn Ver. 2.1

<210> 1

<211> 6999

<212> DNA

<213> Human

<400> 1

```
gccaccagaa gatactacct ggggtgcagtg gaactgtcat gggactatat gcaaagtgat 60
ctcggtgagc tgcctgtgga cgcaagattt cctcctagag tgccaaaatc ttttccattc 120
aacacctcag tcgtgtacaa aaagactctg tttgtagaat tcacggatca ccttttcaac 180
atcgctaagc caaggccacc ctggatgggt ctgctaggtc ctaccatcca ggctgagggt 240
tatgatacag tggtcattac acttaagaac atggcttccc atcctgtcag tcttcatgct 300
gttggtgtat cctactggaa agcttctgag ggagctgaat atgatgatca gaccagtcaa 360
agggagaaag aagatgataa agtcttccct ggtggaagcc atacatatgt ctggcagggtc 420
ctgaaagaga atggtccaat ggcctctgac ccactgtgcc ttacctactc atatctttct 480
catgtggacc tggtaaaaga cttgaattca ggcctcattg gagccctact agtatgtaga 540
gaagggagtc tggccaagga aaagacacag accttgcaca aatttatact actttttgct 600
gtattttgat aagggaaaag ttggcactca gaaacaaaga actccttgat gcaggatagg 660
gatgctgcat ctgctcgggc ctggcctaaa atgcacacag tcaatgggta tgtaaacagg 720
tctctgccag gtctgattgg atgccacagg aaatcagttt attggcatgt gattggaatg 780
ggcaccactc ctgaagtgca ctcaatattc ctggaagggt acacatttct tgtgaggaa 840
catcgccagg cgtccttgga aatctcgcca ataactttcc ttactgctca aacactcttg 900
atggaccttg gacagtttct actgttttgt catatctctt cccaccaaca tgatggcatg 960
gaagcttatg tcaaagtaga cagctgtcca gaggaacccc aactacgaat gaaaaataat 1020
gaagaagcgg aagactatga tgatgatctt actgattctg aaatggatgt ggtcagggtt 1080
gatgatgaca actctccttc ctttatccaa attcgctcag ttgccaagaa gcatcctaaa 1140
acttgggtac attacattgc tgctgaagag gaggactggg actatgctcc cttagtcctc 1200
gccccgatg acagaagtta taaaagtcaa tatttgaaca atggccctca gcggattgggt 1260
```

aggaagtaca aaaaagtccg atttatggca tacacagatg aaacctttta gactcgtgaa 1320
 gctattcagc atgaatcagg aatcttggga cctttacttt atggggaagt tggagacaca 1380
 ctgttgatta tattaagaa tcaagcaagc agaccatata acatctaccc tcacggaatc 1440
 actgatgtcc gtccttttga ttcaaggaga ttaccaaag gtgtaaaaca tttgaaggat 1500
 tttccaattc tgccaggaga aatattcaaa tataaatgga cagtgactgt agaagatggg 1560
 ccaactaaat cagatcctcg gtgcctgacc cgctattact ctagtttctg taatatggag 1620
 agagatctag cttcaggact cattggccct ctctcatct gctacaaaga atctgtagat 1680
 caaagaggaa accagataat gtcagacaag aggaatgtca tcctgttttc tgtatttgat 1740
 gagaaccgaa gctggtacct cacagagaat atacaacgct ttctcccaa tccagctgga 1800
 gtgcagcttg aggatccaga gttccaagcc tccaacatca tgcacagcat caatggctat 1860
 gtttttgata gtttgcagtt gtcagtttgt ttgcatgagg tggcatactg gtacattcta 1920
 agcattggag cacagactga cttcctttct gtcttcttct ctggatatac cttcaaacac 1980
 aaaatggtct atgaagacac actcacccta ttcccattct caggagaaac tgtcttcatg 2040
 tcgatggaaa acccaggctt atggattctg gggtgccaca actcagactt tcggaacaga 2100
 ggcagaccg ccttactgaa ggtttctagt tgtgacaaga acactggtga ttattacgag 2160
 gacagttatg aagatatctc agcatacttg ctgagtaaaa acaatgccat tgaaccaaga 2220
 agcttctccc agaattcaag acaccctagc actaggcaaa agcaatttaa tgccaccaca 2280
 attccagaaa atgacataga gaagactgac ctttggtttg cacacagaac acctatgcct 2340
 aaaatacaaa atgtctctc tagtgatttg ttgatgctct tgcgacagag tctactcca 2400
 catgggctat ccttatctga tctccaagaa gccaaatatg agactttttc tgatgatcca 2460
 tcacctggag caatagacag taataacagc ctgtctgaaa tgacacactt caggccacag 2520
 ctccatcaca gtggggacat ggtatttacc cctgagtcag gcctccaatt aagattaaat 2580
 gagaaactgg ggacaactgc agcaacagag ttgaagaaac ttgatttcaa agtttctagt 2640
 acatcaaata atctgatttc aacaattcca tcagacaatt tggcagcagg tactgataat 2700
 acaagttcct taggaccccc aagtatgcca gttcattatg atagtcaatt agataccact 2760
 ctatttggca aaaagtcac tccccttact gagtctggtg gacctctgag cttgagtga 2820
 gaaaataatg attcaaagtt gttagaatca ggtttaatga atagccaaga aagttcatgg 2880
 ggaaaaaatg tatcgtcaac agagagtggg aggttattta aagggaag agctcatgga 2940
 cctgctttgt tgactaaaga taatgcctta ttcaaagtta gcatctcttt gttaaagaca 3000
 aacaaaactt ccaataattc agcaactaat agaaagactc acattgatgg cccatcatta 3060
 ttaattgaga atagtccatc agtctggcaa aatatattag aaagtgcac tgagtttaa 3120
 aaagtgcac ctttgattca tgacagaatg cttatggaca aaaatgctac agctttgagg 3180
 ctaaatcata tgtcaaataa aactacttca tcaaaaaaca tggaaatggg ccaacagaaa 3240
 aaagagggcc ccattccacc agatgcacaa aatccagata tgtcgttctt taagatgcta 3300
 ttcttgccag aatcagcaag gtggatacaa aggactcatg gaaagaactc tctgaactct 3360
 gggcaaggcc ccagtccaaa gcaattagta tccttaggac cagaaaaatc tgtggaagg 3420
 cagaatttct tgtctgagaa aaacaaagt gtagtaggaa aggggtgaatt tacaaggac 3480
 gtaggactca aagagatggg ttttccaagc agcagaaacc tatttcttac taacttggat 3540
 aatttacatg aaaataatac acacaatcaa gaaaaaaaaa ttcaggaaga aatagaaaag 3600
 aaggaaacat taatccaaga gaatgtagtt ttgcctcaga tacatacagt gactggcact 3660
 aagaatttca tgaagaacct tttcttactg agcactaggc aaaatgtaga aggttcata 3720
 gacggggcat atgctccagt acttcaagat tttaggtcat taaatgattc aacaaataga 3780
 acaagaaac acacagctca tttctcaaaa aaaggggagg aagaaaactt ggaaggcttg 3840
 ggaaatcaaa ccaagcaaat ttagagaaa tatgcatgca ccacaaggat atctccta 3900
 acaagccagc agaattttgt cacgcaacgt agtaagagag ctttgaaaca attcagactc 3960
 ccactagaag aacagaact tgaaaaaagg ataattgtgg atgacacctc aaccagtg 4020
 tcaaaaaaca tgaaacattt gaccccgagc accctcacac agatagacta caatgagaag 4080
 gagaaagggg ccattactca gtctccctta tcagattgcc ttacgaggag tcatagcatc 4140

```

cctcaagcaa atagatctcc attacccatt gcaaaggtat catcatttcc atctattaga 4200
cctatatatc tgaccagggt cctattccaa gacaactctt ctcatcttcc agcagcatct 4260
tatagaaaga aagattcttg ggtccaagaa agcagtcatt tcttacaagg agccaaaaaa 4320
aataaccttt ctttagccat tctaaccttg gagatgactg gtgatcaaag agagggtggc 4380
tccttgggga caagtgccac aaattcagtc acatacaaga aagttgagaa cactgttctc 4440
ccgaaaccag acttgcccaa aacatctggc aaagttgaat tgcttccaaa agttcacatt 4500
tatcagaagg acctattccc tacggaaact agcaatgggt ctcttgcca tctggatctc 4560
gtggaaggga gccttcttca gggaaacagag ggagcgatta agtggaatga agcaaacaga 4620
cctggaaaag ttccctttct gagagtagca acagaaagct ctgcaaagac tccctccaag 4680
ctattggatc ctcttgcttg ggataaccac tatggtactc agataccaaa agaagagtgg 4740
aaatcccaag agaagtcacc agaaaaaaca gcttttaaga aaaaggatac cattttgtcc 4800
ctgaacgctt gtgaaagcaa tcatgcaata gcagcaataa atgagggaaca aaataagccc 4860
gaaatagaag tcacctgggc aaagcaaggt aggactgaaa ggctgtgctc tcaaaaccca 4920
ccagtcttga aacgccatca acgggaaata actcgtacta ctcttcagtc agatcaagag 4980
gaaattgact atgatgatac catatcagtt gaaatgaaga aggaagattt tgacatttat 5040
gatgaggatg aaaatcagag cccccgcagc tttcaaaaga aaacacgaca ctattttatt 5100
gctgcagtgg agaggctctg ggattatggg atgagtagct ccccatgt tctaagaaac 5160
agggctcaga gtggcagtggt ccctcagttc aagaaagttg ttttccagga atttactgat 5220
ggctccttta ctacgccctt ataccgtgga gaactaaatg aacatttggg actcctgggg 5280
ccatatataa gagcagaagt tgaagataat atcatggtaa ctttcagaaa tcaggcctct 5340
cgctccctatt ccttctattc tagccttatt tcttatgagg aagatcagag gcaaggagca 5400
gaacctagaa aaaactttgt caagcctaata gaaacaaaaa cttacttttg gaaagtgcaa 5460
catcatatgg caccactaa agatgagttt gactgcaaag cctgggctta tttctctgat 5520
gttgacctgg aaaaagatgt gcactcaggc ctgattggac cccttctgggt ctgccacact 5580
aacacactga accctgctca tgggagacaa gtgacagtac aggaatttgc tctgttttcc 5640
accatctttg atgagaccaa aagctggtac ttcactgaaa atatggaaag aaactgcagg 5700
gctccctgca atatccagat ggaagatccc acttttaag agaattatcg cttccatgca 5760
atcaatggct acataatgga tacactacct ggcttagtaa tggctcagga tcaaaggatt 5820
cgatgggtatc tgctcagcat gggcagcaat gaaaacatcc attctattca tttcagtggg 5880
catgtgttca ctgtacgaaa aaaagaggag tataaaatgg cactgtacaa tctctatcca 5940
ggtgtttttg agacagtgga aatgttacca tccaaagctg gaatttggcg ggtggaatgc 6000
cttattggcg agcatctaca tgctgggatg agcacacttt ttctggtgta cagcaataag 6060
tgtcagactc ccctgggaat ggcttctgga cacattagag attttcagat tacagcttca 6120
ggacaatatg gacagtgggc cccaaagctg gccagacttc attattccgg atcaatcaat 6180
gcctggagca ccaaggagcc cttttcttg atcaagggtg atctgttggc accaatgatt 6240
attcacggca tcaagaccca gggtgcccg cagaagttct ccagcctcta catctctcag 6300
tttatcatca tgtatagtct tgatgggaag aagtggcaga cttatcgagg aaattccact 6360
ggaaccttaa tggcttctt tggcaatgtg gattcattctg ggataaaaca caatattttt 6420
aaccctccaa ttattgctcg atacatccgt ttgcacccaa ctcatatag cattcgcagc 6480
actcttcgca tggagttgat gggctgtgat ttaaatagtt gcagcatgcc attgggaatg 6540
gagagtaaag caatatcaga tgcacagatt actgcttcat cctactttac caatatgttt 6600
gccacctgggt ctcttcaaaa agctcgactt cacctccaag ggaggagtaa tgcctggaga 6660
cctcaggtga ataatccaaa agagtggctg caagtggact tccagaagac aatgaaagtc 6720
acaggagtaa ctactcaggg agtaaaatct ctgcttacca gcatgtatgt gaaggagttc 6780
ctcatctcca gcagtcaaga tggccatcag tggactctct tttttcagaa tggcaaagta 6840
aaggtttttc agggaaatca agactccttc acacctgtgg tgaactctct agaccaccg 6900
ttactgactc gctaccttcg aattcacccc cagagttggg tgcaccagat tgcctgagg 6960
atggagggttc tgggctgcga ggcacaggac ctctactga 6999

```

<210> 2

<211> 2332

<212> PRT

<213> Human

<400> 2

Ala Thr Arg Arg Tyr Tyr Leu Gly Ala Val Glu Leu Ser Trp Asp Tyr
 1 5 10 15

Met Gln Ser Asp Leu Gly Glu Leu Pro Val Asp Ala Arg Phe Pro Pro
 20 25 30

Arg Val Pro Lys Ser Phe Pro Phe Asn Thr Ser Val Val Tyr Lys Lys
 35 40 45

Thr Leu Phe Val Glu Phe Thr Val His Leu Phe Asn Ile Ala Lys Pro
 50 55 60

Arg Pro Pro Trp Met Gly Leu Leu Gly Pro Thr Ile Gln Ala Glu Val
 65 70 75 80

Tyr Asp Thr Val Val Ile Thr Leu Lys Asn Met Ala Ser His Pro Val
 85 90 95

Ser Leu His Ala Val Gly Val Ser Tyr Trp Lys Ala Ser Glu Gly Ala
 100 105 110

Glu Tyr Asp Asp Gln Thr Ser Gln Arg Glu Lys Glu Asp Asp Lys Val
 115 120 125

Phe Pro Gly Gly Ser His Thr Tyr Val Trp Gln Val Leu Lys Glu Asn
 130 135 140

Gly Pro Met Ala Ser Asp Pro Leu Cys Leu Thr Tyr Ser Tyr Leu Ser
 145 150 155 160

His Val Asp Leu Val Lys Asp Leu Asn Ser Gly Leu Ile Gly Ala Leu
 165 170 175

Leu Val Cys Arg Glu Gly Ser Leu Ala Lys Glu Lys Thr Gln Thr Leu
 180 185 190

His Lys Phe Ile Leu Leu Phe Ala Val Phe Asp Glu Gly Lys Ser Trp
 195 200 205

His Ser Glu Thr Lys Asn Ser Leu Met Gln Asp Arg Asp Ala Ala Ser

210	215	220
Ala Arg Ala Trp Pro Lys Met His Thr Val Asn Gly Tyr Val Asn Arg		
225	230	235 240
Ser Leu Pro Gly Leu Ile Gly Cys His Arg Lys Ser Val Tyr Trp His		
245	250	255
Val Ile Gly Met Gly Thr Thr Pro Glu Val His Ser Ile Phe Leu Glu		
260	265	270
Gly His Thr Phe Leu Val Arg Asn His Arg Gln Ala Ser Leu Glu Ile		
275	280	285
Ser Pro Ile Thr Phe Leu Thr Ala Gln Thr Leu Leu Met Asp Leu Gly		
290	295	300
Gln Phe Leu Leu Phe Cys His Ile Ser Ser His Gln His Asp Gly Met		
305	310	315 320
Glu Ala Tyr Val Lys Val Asp Ser Cys Pro Glu Glu Pro Gln Leu Arg		
325	330	335
Met Lys Asn Asn Glu Glu Ala Glu Asp Tyr Asp Asp Asp Leu Thr Asp		
340	345	350
Ser Glu Met Asp Val Val Arg Phe Asp Asp Asp Asn Ser Pro Ser Phe		
355	360	365
Ile Gln Ile Arg Ser Val Ala Lys Lys His Pro Lys Thr Trp Val His		
370	375	380
Tyr Ile Ala Ala Glu Glu Glu Asp Trp Asp Tyr Ala Pro Leu Val Leu		
385	390	395 400
Ala Pro Asp Asp Arg Ser Tyr Lys Ser Gln Tyr Leu Asn Asn Gly Pro		
405	410	415
Gln Arg Ile Gly Arg Lys Tyr Lys Lys Val Arg Phe Met Ala Tyr Thr		
420	425	430
Asp Glu Thr Phe Lys Thr Arg Glu Ala Ile Gln His Glu Ser Gly Ile		
435	440	445
Leu Gly Pro Leu Leu Tyr Gly Glu Val Gly Asp Thr Leu Leu Ile Ile		
450	455	460
Phe Lys Asn Gln Ala Ser Arg Pro Tyr Asn Ile Tyr Pro His Gly Ile		

465	470	475	480
Thr Asp Val Arg Pro Leu Tyr Ser Arg Arg Leu Pro Lys Gly Val Lys			
	485	490	495
His Leu Lys Asp Phe Pro Ile Leu Pro Gly Glu Ile Phe Lys Tyr Lys			
	500	505	510
Trp Thr Val Thr Val Glu Asp Gly Pro Thr Lys Ser Asp Pro Arg Cys			
	515	520	525
Leu Thr Arg Tyr Tyr Ser Ser Phe Val Asn Met Glu Arg Asp Leu Ala			
	530	535	540
Ser Gly Leu Ile Gly Pro Leu Leu Ile Cys Tyr Lys Glu Ser Val Asp			
545	550	555	560
Gln Arg Gly Asn Gln Ile Met Ser Asp Lys Arg Asn Val Ile Leu Phe			
	565	570	575
Ser Val Phe Asp Glu Asn Arg Ser Trp Tyr Leu Thr Glu Asn Ile Gln			
	580	585	590
Arg Phe Leu Pro Asn Pro Ala Gly Val Gln Leu Glu Asp Pro Glu Phe			
	595	600	605
Gln Ala Ser Asn Ile Met His Ser Ile Asn Gly Tyr Val Phe Asp Ser			
610	615	620	
Leu Gln Leu Ser Val Cys Leu His Glu Val Ala Tyr Trp Tyr Ile Leu			
625	630	635	640
Ser Ile Gly Ala Gln Thr Asp Phe Leu Ser Val Phe Phe Ser Gly Tyr			
	645	650	655
Thr Phe Lys His Lys Met Val Tyr Glu Asp Thr Leu Thr Leu Phe Pro			
	660	665	670
Phe Ser Gly Glu Thr Val Phe Met Ser Met Glu Asn Pro Gly Leu Trp			
	675	680	685
Ile Leu Gly Cys His Asn Ser Asp Phe Arg Asn Arg Gly Met Thr Ala			
690	695	700	
Leu Leu Lys Val Ser Ser Cys Asp Lys Asn Thr Gly Asp Tyr Tyr Glu			
705	710	715	720
Asp Ser Tyr Glu Asp Ile Ser Ala Tyr Leu Leu Ser Lys Asn Asn Ala			

725	730	735
Ile Glu Pro Arg Ser Phe Ser Gln Asn Ser Arg His Pro Ser Thr Arg		
740	745	750
Gln Lys Gln Phe Asn Ala Thr Thr Ile Pro Glu Asn Asp Ile Glu Lys		
755	760	765
Thr Asp Pro Trp Phe Ala His Arg Thr Pro Met Pro Lys Ile Gln Asn		
770	775	780
Val Ser Ser Ser Asp Leu Leu Met Leu Leu Arg Gln Ser Pro Thr Pro		
785	790	795
800		
His Gly Leu Ser Leu Ser Asp Leu Gln Glu Ala Lys Tyr Glu Thr Phe		
805	810	815
Ser Asp Asp Pro Ser Pro Gly Ala Ile Asp Ser Asn Asn Ser Leu Ser		
820	825	830
Glu Met Thr His Phe Arg Pro Gln Leu His His Ser Gly Asp Met Val		
835	840	845
Phe Thr Pro Glu Ser Gly Leu Gln Leu Arg Leu Asn Glu Lys Leu Gly		
850	855	860
Thr Thr Ala Ala Thr Glu Leu Lys Lys Leu Asp Phe Lys Val Ser Ser		
865	870	875
880		
Thr Ser Asn Asn Leu Ile Ser Thr Ile Pro Ser Asp Asn Leu Ala Ala		
885	890	895
Gly Thr Asp Asn Thr Ser Ser Leu Gly Pro Pro Ser Met Pro Val His		
900	905	910
Tyr Asp Ser Gln Leu Asp Thr Thr Leu Phe Gly Lys Lys Ser Ser Pro		
915	920	925
Leu Thr Glu Ser Gly Gly Pro Leu Ser Leu Ser Glu Glu Asn Asn Asp		
930	935	940
Ser Lys Leu Leu Glu Ser Gly Leu Met Asn Ser Gln Glu Ser Ser Trp		
945	950	955
960		
Gly Lys Asn Val Ser Ser Thr Glu Ser Gly Arg Leu Phe Lys Gly Lys		
965	970	975
Arg Ala His Gly Pro Ala Leu Leu Thr Lys Asp Asn Ala Leu Phe Lys		

980	985	990
Val Ser Ile Ser Leu Leu Lys Thr Asn Lys Thr Ser Asn Asn Ser Ala		
995	1000	1005
Thr Asn Arg Lys Thr His Ile Asp Gly Pro Ser Leu Leu Ile Glu Asn		
1010	1015	1020
Ser Pro Ser Val Trp Gln Asn Ile Leu Glu Ser Asp Thr Glu Phe Lys		
1025	1030	1035 1040
Lys Val Thr Pro Leu Ile His Asp Arg Met Leu Met Asp Lys Asn Ala		
1045	1050	1055
Thr Ala Leu Arg Leu Asn His Met Ser Asn Lys Thr Thr Ser Ser Lys		
1060	1065	1070
Asn Met Glu Met Val Gln Gln Lys Lys Glu Gly Pro Ile Pro Pro Asp		
1075	1080	1085
Ala Gln Asn Pro Asp Met Ser Phe Phe Lys Met Leu Phe Leu Pro Glu		
1090	1095	1100
Ser Ala Arg Trp Ile Gln Arg Thr His Gly Lys Asn Ser Leu Asn Ser		
1105	1110	1115 1120
Gly Gln Gly Pro Ser Pro Lys Gln Leu Val Ser Leu Gly Pro Glu Lys		
1125	1130	1135
Ser Val Glu Gly Gln Asn Phe Leu Ser Glu Lys Asn Lys Val Val Val		
1140	1145	1150
Gly Lys Gly Glu Phe Thr Lys Asp Val Gly Leu Lys Glu Met Val Phe		
1155	1160	1165
Pro Ser Ser Arg Asn Leu Phe Leu Thr Asn Leu Asp Asn Leu His Glu		
1170	1175	1180
Asn Asn Thr His Asn Gln Glu Lys Lys Ile Gln Glu Glu Ile Glu Lys		
1185	1190	1195 1200
Lys Glu Thr Leu Ile Gln Glu Asn Val Val Leu Pro Gln Ile His Thr		
1205	1210	1215
Val Thr Gly Thr Lys Asn Phe Met Lys Asn Leu Phe Leu Leu Ser Thr		
1220	1225	1230
Arg Gln Asn Val Glu Gly Ser Tyr Glu Gly Ala Tyr Ala Pro Val Leu		

1235	1240	1245
Gln Asp Phe Arg Ser Leu Asn Asp Ser Thr Asn Arg Thr Lys Lys His		
1250	1255	1260
Thr Ala His Phe Ser Lys Lys Gly Glu Glu Glu Asn Leu Glu Gly Leu		
1265	1270	1275 1280
Gly Asn Gln Thr Lys Gln Ile Val Glu Lys Tyr Ala Cys Thr Thr Arg		
1285	1290	1295
Ile Ser Pro Asn Thr Ser Gln Gln Asn Phe Val Thr Gln Arg Ser Lys		
1300	1305	1310
Arg Ala Leu Lys Gln Phe Arg Leu Pro Leu Glu Glu Thr Glu Leu Glu		
1315	1320	1325
Lys Arg Ile Ile Val Asp Asp Thr Ser Thr Gln Trp Ser Lys Asn Met		
1330	1335	1340
Lys His Leu Thr Pro Ser Thr Leu Thr Gln Ile Asp Tyr Asn Glu Lys		
1345	1350	1355 1360
Glu Lys Gly Ala Ile Thr Gln Ser Pro Leu Ser Asp Cys Leu Thr Arg		
1365	1370	1375
Ser His Ser Ile Pro Gln Ala Asn Arg Ser Pro Leu Pro Ile Ala Lys		
1380	1385	1390
Val Ser Ser Phe Pro Ser Ile Arg Pro Ile Tyr Leu Thr Arg Val Leu		
1395	1400	1405
Phe Gln Asp Asn Ser Ser His Leu Pro Ala Ala Ser Tyr Arg Lys Lys		
1410	1415	1420
Asp Ser Gly Val Gln Glu Ser Ser His Phe Leu Gln Gly Ala Lys Lys		
1425	1430	1435 1440
Asn Asn Leu Ser Leu Ala Ile Leu Thr Leu Glu Met Thr Gly Asp Gln		
1445	1450	1455
Arg Glu Val Gly Ser Leu Gly Thr Ser Ala Thr Asn Ser Val Thr Tyr		
1460	1465	1470
Lys Lys Val Glu Asn Thr Val Leu Pro Lys Pro Asp Leu Pro Lys Thr		
1475	1480	1485
Ser Gly Lys Val Glu Leu Leu Pro Lys Val His Ile Tyr Gln Lys Asp		

1490	1495	1500
Leu Phe Pro Thr Glu Thr Ser Asn Gly Ser Pro Gly His Leu Asp Leu		
1505	1510	1515 1520
Val Glu Gly Ser Leu Leu Gln Gly Thr Glu Gly Ala Ile Lys Trp Asn		
1525	1530	1535
Glu Ala Asn Arg Pro Gly Lys Val Pro Phe Leu Arg Val Ala Thr Glu		
1540	1545	1550
Ser Ser Ala Lys Thr Pro Ser Lys Leu Leu Asp Pro Leu Ala Trp Asp		
1555	1560	1565
Asn His Tyr Gly Thr Gln Ile Pro Lys Glu Glu Trp Lys Ser Gln Glu		
1570	1575	1580
Lys Ser Pro Glu Lys Thr Ala Phe Lys Lys Lys Asp Thr Ile Leu Ser		
1585	1590	1595 1600
Leu Asn Ala Cys Glu Ser Asn His Ala Ile Ala Ala Ile Asn Glu Gly		
1605	1610	1615
Gln Asn Lys Pro Glu Ile Glu Val Thr Trp Ala Lys Gln Gly Arg Thr		
1620	1625	1630
Glu Arg Leu Cys Ser Gln Asn Pro Pro Val Leu Lys Arg His Gln Arg		
1635	1640	1645
Glu Ile Thr Arg Thr Thr Leu Gln Ser Asp Gln Glu Glu Ile Asp Tyr		
1650	1655	1660
Asp Asp Thr Ile Ser Val Glu Met Lys Lys Glu Asp Phe Asp Ile Tyr		
1665	1670	1675 1680
Asp Glu Asp Glu Asn Gln Ser Pro Arg Ser Phe Gln Lys Lys Thr Arg		
1685	1690	1695
His Tyr Phe Ile Ala Ala Val Glu Arg Leu Trp Asp Tyr Gly Met Ser		
1700	1705	1710
Ser Ser Pro His Val Leu Arg Asn Arg Ala Gln Ser Gly Ser Val Pro		
1715	1720	1725
Gln Phe Lys Lys Val Val Phe Gln Glu Phe Thr Asp Gly Ser Phe Thr		
1730	1735	1740
Gln Pro Leu Tyr Arg Gly Glu Leu Asn Glu His Leu Gly Leu Leu Gly		

1745	1750	1755	1760
Pro Tyr Ile Arg Ala Glu Val Glu Asp Asn Ile Met Val Thr Phe Arg			
1765	1770	1775	
Asn Gln Ala Ser Arg Pro Tyr Ser Phe Tyr Ser Ser Leu Ile Ser Tyr			
1780	1785	1790	
Glu Glu Asp Gln Arg Gln Gly Ala Glu Pro Arg Lys Asn Phe Val Lys			
1795	1800	1805	
Pro Asn Glu Thr Lys Thr Tyr Phe Trp Lys Val Gln His His Met Ala			
1810	1815	1820	
Pro Thr Lys Asp Glu Phe Asp Cys Lys Ala Trp Ala Tyr Phe Ser Asp			
1825	1830	1835	1840
Val Asp Leu Glu Lys Asp Val His Ser Gly Leu Ile Gly Pro Leu Leu			
1845	1850	1855	
Val Cys His Thr Asn Thr Leu Asn Pro Ala His Gly Arg Gln Val Thr			
1860	1865	1870	
Val Gln Glu Phe Ala Leu Phe Phe Thr Ile Phe Asp Glu Thr Lys Ser			
1875	1880	1885	
Trp Tyr Phe Thr Glu Asn Met Glu Arg Asn Cys Arg Ala Pro Cys Asn			
1890	1895	1900	
Ile Gln Met Glu Asp Pro Thr Phe Lys Glu Asn Tyr Arg Phe His Ala			
1905	1910	1915	1920
Ile Asn Gly Tyr Ile Met Asp Thr Leu Pro Gly Leu Val Met Ala Gln			
1925	1930	1935	
Asp Gln Arg Ile Arg Trp Tyr Leu Leu Ser Met Gly Ser Asn Glu Asn			
1940	1945	1950	
Ile His Ser Ile His Phe Ser Gly His Val Phe Thr Val Arg Lys Lys			
1955	1960	1965	
Glu Glu Tyr Lys Met Ala Leu Tyr Asn Leu Tyr Pro Gly Val Phe Glu			
1970	1975	1980	
Thr Val Glu Met Leu Pro Ser Lys Ala Gly Ile Trp Arg Val Glu Cys			
1985	1990	1995	2000
Leu Ile Gly Glu His Leu His Ala Gly Met Ser Thr Leu Phe Leu Val			

2005	2010	2015
Tyr Ser Asn Lys Cys Gln Thr Pro Leu Gly Met Ala Ser Gly His Ile 2020	2025	2030
Arg Asp Phe Gln Ile Thr Ala Ser Gly Gln Tyr Gly Gln Trp Ala Pro 2035	2040	2045
Lys Leu Ala Arg Leu His Tyr Ser Gly Ser Ile Asn Ala Trp Ser Thr 2050	2055	2060
Lys Glu Pro Phe Ser Trp Ile Lys Val Asp Leu Leu Ala Pro Met Ile 2065	2070	2075 2080
Ile His Gly Ile Lys Thr Gln Gly Ala Arg Gln Lys Phe Ser Ser Leu 2085	2090	2095
Tyr Ile Ser Gln Phe Ile Ile Met Tyr Ser Leu Asp Gly Lys Lys Trp 2100	2105	2110
Gln Thr Tyr Arg Gly Asn Ser Thr Gly Thr Leu Met Val Phe Phe Gly 2115	2120	2125
Asn Val Asp Ser Ser Gly Ile Lys His Asn Ile Phe Asn Pro Pro Ile 2130	2135	2140
Ile Ala Arg Tyr Ile Arg Leu His Pro Thr His Tyr Ser Ile Arg Ser 2145	2150	2155 2160
Thr Leu Arg Met Glu Leu Met Gly Cys Asp Leu Asn Ser Cys Ser Met 2165	2170	2175
Pro Leu Gly Met Glu Ser Lys Ala Ile Ser Asp Ala Gln Ile Thr Ala 2180	2185	2190
Ser Ser Tyr Phe Thr Asn Met Phe Ala Thr Trp Ser Pro Ser Lys Ala 2195	2200	2205
Arg Leu His Leu Gln Gly Arg Ser Asn Ala Trp Arg Pro Gln Val Asn 2210	2215	2220
Asn Pro Lys Glu Trp Leu Gln Val Asp Phe Gln Lys Thr Met Lys Val 2225	2230	2235 2240
Thr Gly Val Thr Thr Gln Gly Val Lys Ser Leu Leu Thr Ser Met Tyr 2245	2250	2255
Val Lys Glu Phe Leu Ile Ser Ser Ser Gln Asp Gly His Gln Trp Thr		

2260

2265

2270

Leu Phe Phe Gln Asn Gly Lys Val Lys Val Phe Gln Gly Asn Gln Asp
 2275 2280 2285

Ser Phe Thr Pro Val Val Asn Ser Leu Asp Pro Pro Leu Leu Thr Arg
 2290 2295 2300

Tyr Leu Arg Ile His Pro Gln Ser Trp Val His Gln Ile Ala Leu Arg
 2305 2310 2315 2320

Met Glu Val Leu Gly Cys Glu Ala Gln Asp Leu Tyr
 2325 2330

<210> 3

<211> 17

<212> PRT

<213> Human

<400> 3

Glu Gly Ala Ser Tyr Leu Asp His Thr Phe Pro Ala Glu Lys Met Asp
 1 5 10 15

Asp

<210> 4

<211> 17

<212> PRT

<213> Human

<400> 4

Glu Gly Ala Glu Tyr Asp Asp Gln Thr Ser Gln Arg Glu Lys Glu Asp
 1 5 10 15

Asp

<210> 5

<211> 17

<212> PRT

<213> Porcine

<400> 5

Glu Gly Ala Glu Tyr Glu Asp His Thr Ser Gln Arg Glu Lys Glu Asp

1

5

10

15

Asp

<210> 6

<211> 17

<212> PRT

<213> Murine

<400> 6

Glu Gly Asp Glu Tyr Glu Asp Gln Thr Ser Gln Met Glu Lys Glu Asp

1

5

10

15

Asp

<210> 7

<211> 17

<212> PRT

<213> Canine

<400> 7

Glu Gly Ala Glu Tyr Glu Asp Gln Thr Ser Gln Lys Glu Lys Glu Asp

1

5

10

15

Asp